MODEL 121B

AC Power Source

Instruction Manual

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Elgar Electronics Corporation (hereinafter referred to as Elgar) warrants its products to be free from defects in material and workmanship. This warranty is effective for two years from the date of shipment of the product to the original purchaser. Liability of Elgar under this warranty shall exist provided that:

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- Elgar is promptly notified of defects by the Buyer and that notification occurs within the warranty period;
- the Buyer receives a Return Material Authorization (RMA) number from Elgar's Repair Department prior to the return of the product to Elgar for repair, phone 800-73-ELGAR (800-733-5427), ext. 2295;
- the Buyer returns the defective product in the original, or equivalent, shipping container;
- if, upon examination of such product by Elgar it is disclosed that, in fact, a defect in materials and/or workmanship does exist, that the defect in the product was not caused by improper conditions, misuse, or negligence; and,
- that Elgar QA seal and nameplates have not been altered or removed and the equipment has not been repaired or modified by anyone other than Elgar authorized personnel.

This warranty is exclusive and in lieu of all other warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness of the product to a particular purpose. Elgar, its agents, or representatives shall in no circumstance be liable for any direct, indirect, special, penal, or consequential loss or damage of any nature resulting from the malfunction of the product. Remedies under this warranty are expressly limited to repair or replacement of the product.

CONDITIONS OF WARRANTY

- To return a defective product, contact an Elgar representative or the Elgar factory for an RMA number. Unauthorized returns will not be accepted and will be returned at the shipper's expense.
- For Elgar products found to be defective within thirty days of receipt by the original purchaser, Elgar will absorb all ground freight charges for the repair. Products found defective within the warranty period, but beyond the initial thirty-day period, should be returned prepaid to Elgar for repair. Elgar will repair the unit and return it by ground freight pre-paid.
- Normal warranty service is performed at Elgar during the weekday hours of 7:30 am to 4:30 pm Pacific time. Warranty repair work requested to be accomplished outside of normal working hours will be subject to Elgar non-warranty service rates.
- Warranty field service is available on an emergency basis. Travel expenses (travel time, per diem expense, and related air fare) are the responsibility of the Buyer. A Buyer purchase order is required by Elgar prior to scheduling.
- A returned product found, upon inspection by Elgar, to be in specification is subject to an inspection fee and applicable freight charges.
- Equipment purchased in the United States carries only a United States warranty for which repair must be accomplished at the Elgar factory.

ELGAR

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SECTION I
GENERAL DESCRIPTION

1-1. SCOPE OF MANUAL

1-2. This manual describes the Model 121B AC Power Source manufactured by Elgar Corporation. It provides operating, maintenance, and adjustment instructions; a circuit description, a schematic diagram; and a parts list.

1-3. INTRODUCTION

1-4. The Elgar Model 121B AC Power Source provides AC power at precise frequencies for testing, motor operation, and frequency conversion. The basic power amplifier consists of two DC supplies and a direct-coupled amplifier with a tapped output transformer. The output transformer provides adjustable output voltage ranges of 0-130VAC and 0-260VAC. The total output power of 120 volt-amperes at available from 110VAC to 130VAC on the 0-130VAC output voltage range, and from 220VAC to 260VAC on the 0-260VAC output voltage range. Power at less than the full rated output voltage is derated as illustrated in Figure 1-1. Shown in Figure 1-2 is a curve of typical harmonic distortion. Input power frequency is 50-60Hz. The input power transformer can be wired for either 115VAC or 230VAC nominal input voltages.

1-5. Output power frequency is established by a plug-in oscillator. Output frequency range of the Model 121B is 45 to 10KHz. A variety of plug-in oscillators are available with frequency accuracy of up to 0.0001%.

1-6. The Elgar AC Power Source facilitates equipment tests to meet military specification operating requirements over the frequency range of 47-63Hz or 47-425Hz. The basic power source output is single-phase. Multiphase power can be obtained however, by stacking two or three power sources, all driven by the same multiphase plug-in oscillator.

1-7. GENERAL DESCRIPTION

1-8. The Elgar Model 121B AC Power Source is contained in a rack mount enclosure. A voltmeter for output voltage monitoring, a power-on indicator, a voltage amplitude control, and a power circuit breaker that applies input line power to the unit are located on the front panel. Cooling air is drawn in through a front panel grill and is exhausted at the rear of the enclosure.

1-9. The enclosure contains two heatsink assemblies, which comprise a two-section power amplifier. Control circuitry is mounted on a circuit board with test points and adjustment controls available on the top side of the board. Output power is available at the rear panel output power terminal block, and at the red, white and black binding posts located on the front panel of the unit.

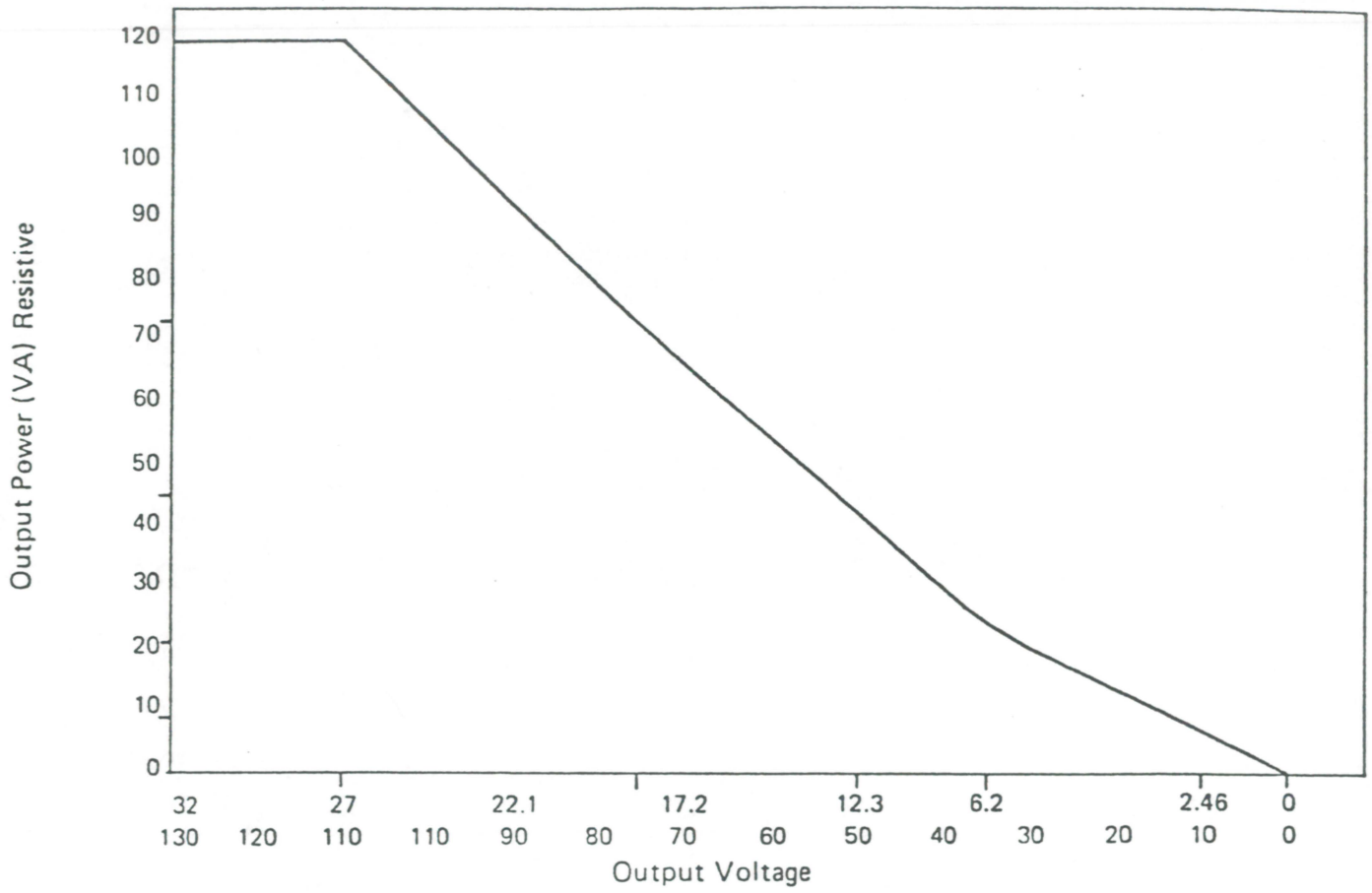


Figure 1-1. Power Output Derating

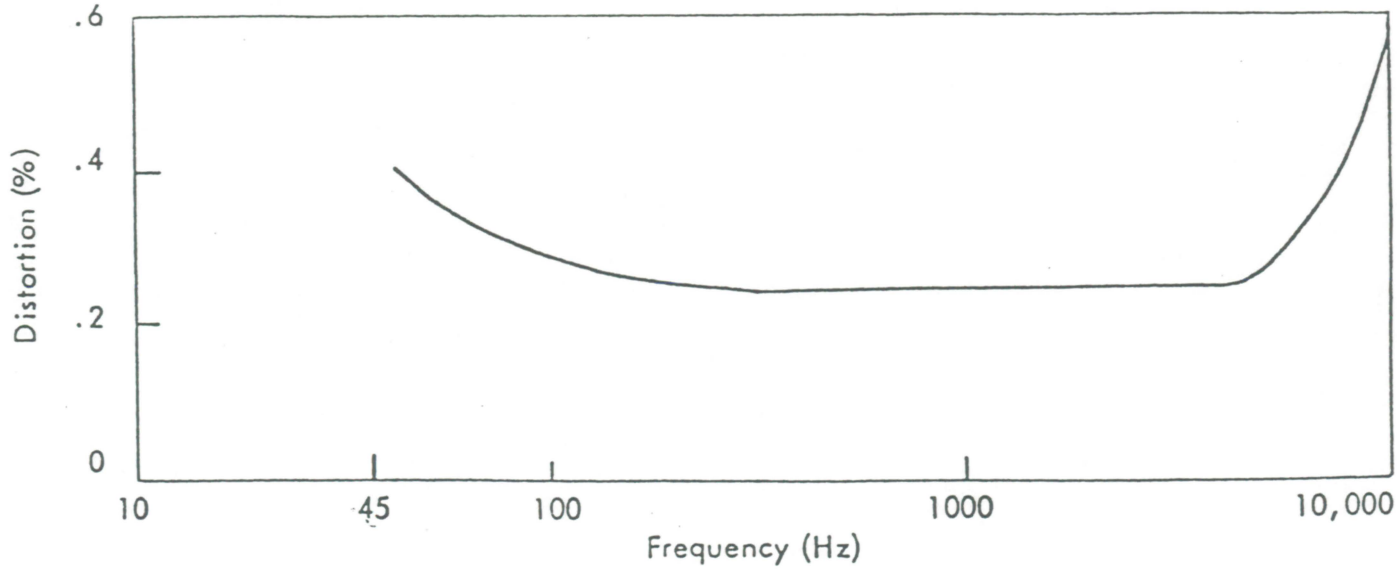


Figure 1-2. Typical Harmonic Distortion at 120 VA

SECTION II
SPECIFICATIONS

Output Power	0-120VA
Power Factor	Unity to ± 0.7
Output Voltage	Adjustable 0-65, 0-130, or 0-260VAC
Output Frequency Rage	45Hz to 10KHz at full rated power
Distortion	Less than 0.9% THD (45-5000Hz) Less than 0.5% THD (100-1000Hz)
Output Noise	70 dB below full rated output voltage
Load Regulation	±1%, no load to full load over full frequency range, adjustable to zero for specific load and frequency
Line Regulation	±0.25% 115VAC ±10% ±0.25% 230VAC ±10%
Short Circuit Protection	Output may be shorted and recovers immediately when short is removed
Input Power	One phase 115 or 230VAC, 45-65Hz, 360VA maximum
Temperature Range	0-50°C (Operating)
Dimensions	3.5"H x 19"W relay rack panel by 14" deep overall
Weight	Approximately 45 pounds

SECTION III
OPERATION

3-1. The Elgar AC Power Source has been aligned and tested prior to shipment. Therefore, the instrument is ready for immediate use upon receipt. The following checks should be conducted to ensure that no damage has been sustained by the instrument during shipment.

1. Inspect the shipping container prior to accepting the container from the carrier. If damage to the container is evident, a description of the damage shall be noted on the carrier's receipt, then signed by the carrier's agent.

2. If damage is not apparent until the contents are unpacked, a claim for concealed damage shall be placed with the carrier. The shipping container(s) and filler material shall be saved for subsequent inspection.

3. Forward a report of any damage to the Elgar Service Department. Elgar will provide instructions for repair or replacement of the instrument.

3-3. INSTALLATION AND OPERATION

1. The Elgar AC Power Source is designed for installation in a standard electrical equipment rack. Install the AC Power Source so that the flow of cooling air into the front panel grill is unobstructed.

2. Insert the plug-in oscillator.

3. Connect the load to the appropriate terminal of the rear panel power output terminal block (see Figure 3-1). For bench mounted applications, the front panel binding posts may be used for either 0-130VAC or 0-260VAC output voltage ranges.

4. Connect the input power line cord on the rear panel to an appropriate source of single phase power.*

5. Turn front panel power switch circuit breaker ON. The power on indicator will illuminate.

6. Adjust front panel AMPLITUDE control for the desired output voltage as indicated on the front panel voltmeter.

7. With the output jumpered for 0-130VAC range, the front panel voltmeter indicates the supplied voltage. When the output is jumpered for 0-260VAC range, the front panel voltmeter reads one-half of the supplied voltage.

* See main schematic for 115VAC or 230VAC input power connections.

NOTE

Certain Elgar plug-in oscillators do not require the use of the front panel AMPLITUDE control. Others are remotely programmed. Consult the oscillator instruction manual.

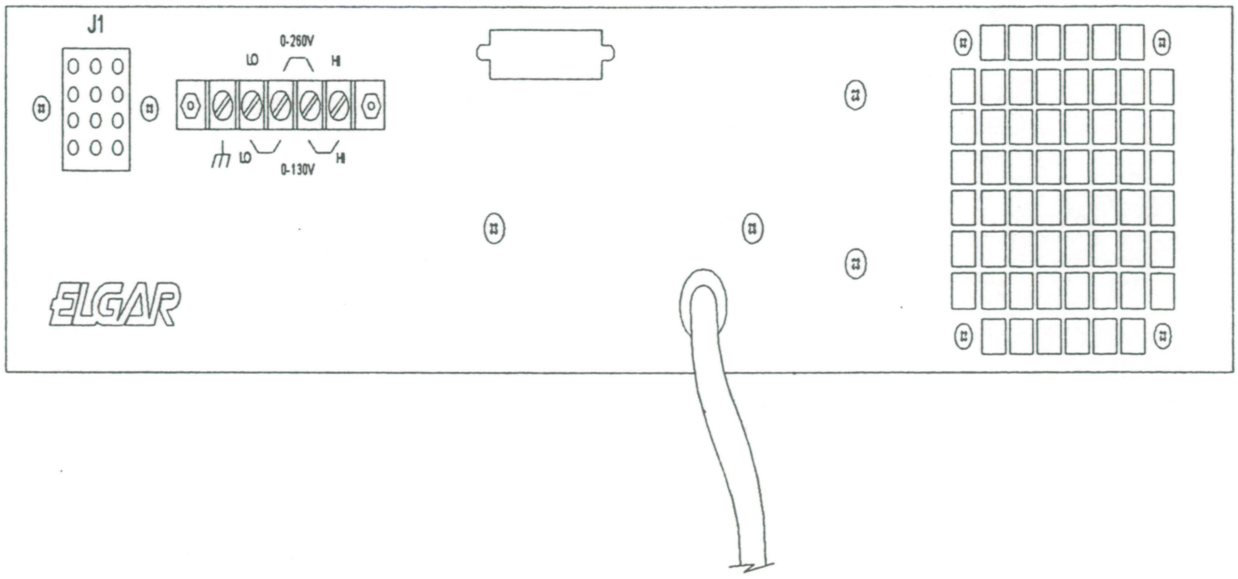


Figure 3-1. Rear Panel

SECTION IV
THEORY OF OPERATION

4-1. CIRCUIT DESCRIPTION

4-2. The input signal, approximately 3 VRMS, is provided by the plug-in oscillator. For most oscillators, the input signal amplitude is controlled by front panel AMPLITUDE control, R1. The signal is applied to the first amplifier stage consisting of differential amplifier Q1 and Q2. The differential amplifier provides high DC stability. The emitter currents are supplied by R10 from a +12V supply regulated by CR1. The output of Q1 is coupled to the base Q3 which provides drive signals to the complementary driver stage, Q6 and Q7. Q7 operates as an emitter follower to drive emitter follower Q8 which provides base drive signals to the upper half of the push-pull class B power amplifier. Q6 is operated as a common emitter stage to provide phase inversion of the drive signals to the lower half of the power amplifier. The output of Q6 is applied to emitter follower Q11 which provides base drive signals to the lower half of the power amplifier.

4-3. The power amplifier consists of 4 power transistors mounted on two heat sinks. The .22 ohms emitter resistors ensure equal current sharing of the output transistors. The driver and output stages are operated from nominal ±40 VDC supplies. Thermal switch shown on heatsink No. 1 turns drive signals off to the power amplifier in the event the power amplifier overheats from excessive load or restricted air flow through the wind tunnel.

4-4. The power amplifier is also protected from overloads or short circuits on the output by current limit transistors Q4 and Q5. The current in the upper half of the power amplifier is sampled by R35 and applied to the base of Q5 through selected resistor R28. When the voltage at the base of Q5 reach Q5's conduction threshold (approximately .6V) drive signal is diverted from the base of Q7 thus preventing any further increase in output current. Simultaneously, the current in the lower half of the power amplifier is sampled by R31. This voltage is applied to the base of Q4 through selected resitor R29. When the voltage at the base of Q4 reaches Q4's conduction threshold, drive signal is diverted from the base of Q6 preventing any further increase in output current of the lower half of the power amplifier.

4-5. Amplifier output (TP2) is connected to output transformer T2, which steps up the amplifier voltage to the required output level. Negative AC feedback path is from TP2 through R16 to the base of Q1. Capacitor C7 across R16 is used to prevent high frequency oscillations in output. Load regulation is accomplished by passing the TP2 wire from the heat-sink plugs through

a current transformer T3. Positive current feedback is taken across the secondary through regulation adjustment potentiometer R7 and to the base Q1 through R5. R6 and C4 are used as high frequency regulation boost network.

4-6. POWER SUPPLIES

4-7. Plus and minus 40 VDC for the power amplifiers are developed by rectifier bridge from the secondary voltage of power transformer T1. C1-C2 are filter capacitors for these supplies and R2 and R3 are bleeder resistors.

4-8. INTERCONNECTIONS FOR MULTIPHASE OPERATION

4-9. Two or three Model 121B power Sources may be used to generate two-phase or three-phase AC power. Two-phase or three-phase signals are generated in a two-phase or three-phase oscillator installed in the master power amplifier. Signals from the oscillator are carried to tone or two slave power amplifiers (see Figure 4-1), each of which has a dummy oscillator plug-in which makes the required signal interconnections installed in it. The front panel AMPLITUDE control on the master amplifier controls the amplitude of all the amplifiers' outputs simultaneously. The front panel AMPLITUDE controls of the slave amplifier(s) however, must intially be set so that their output voltages equal the master amplifier output voltage.

4-10. Two-phase operation requires two power sources. Three-phase operation may be accomplished with three power sources in "wye" connection, or with two power sources in open-delta connection. The use of three Model 121B's for three-phase operation provides 360 VA total output, while the use of two power sources provides 240 VA total output. A more detailed circuit description of two-phase and three-phase power sources is provided in the oscillator instruction manuals.

4-11. The 400 SR plug-in is a universal signal routing plug-in used in multi-phase systems to route drive signal from a master plug-in oscillator or an external oscillator source. The routing is accomplished by the closing of specific switches on the 8 pole single throw DIP Switch. Standard plug-ins are as follows (for special configurations refer to the addendum):

Model 400—A External oscillator adaptor. Has front panel phone jack and routes signal to power amplifier input. DIP Switch not necessary. If present switches 7&8 must be ON connecting pins 14 to 21 and 16 to 12

400—B Blank plug-in used in 2nd amplifier (B phase) of multi-phase system. Routes appropriate signal from oscillator in 1st amplifier in-put switches 6 7 8 must be ON, connecting pins 22 to 11, 21 to 14, 16 to 12

400—C Blank plug-in used in 3rd amplifier (C phase) of 3 amplifier, 3 phase system. Routes appropriate signal from oscillator in 1st amplifier to 3rd amplifier input. Switches 5 7 8 must be ON, connecting pins 22-10, 21-14, 16 to 12

400 BT Blank plug-in used in 2nd amplifier(s) in a Tandem System such as 2000-1. Also used in single phase TG 704A systems or in phase A of multi-phase TG 704A-3 systems. Switches 4 7 8 must be ON connecting pins 22 to 9, 21 to 14 and 16 to 12

400—DPA Blank plug-in used in single phase DAP systems or in phase A of multi-phase DAP systems. Switch 3 8 must be ON connecting pins 14 to 9 and 16 to 12

400—DPB Blank plug-in used in phase B of multi-phase DAP systems.

Switches 1 8 must be ON connecting pins 14 to 11 and 16 to 12

400—DPC Blank plug-in used in phase C of multi-phase DAP systems. Switches 2 8 must be ON connecting pins 14 to 10 and 16 to 12

400—TGB Plug in used in single package 30 units such as 1753B when used with TG 704A-3. It has front panel B and C phase amplitude pots. Switches 4 7 8 must be ON connecting pins 22 to 9, 21 to 14 and 16 to 12

4-12. In the open delta configuration two power amplifiers of equal VA rating are driven by a standard three phase oscillator having 120° phase angle between ØA, ØB and ØC. An open delta requires that two amplifiers have a 60° phase angle between them and this is accomplished by inverting the second amplifier.

4-13. In these systems the amplifier containing the plug-in oscillator is referred to as the master or A phase source. The second amplifier is referred to as the slave or B phase source.

4-14. The open delta hook-up shown in Figure 4-2 page 4-4 is shown below as a vector diagram in Figure 4-1.

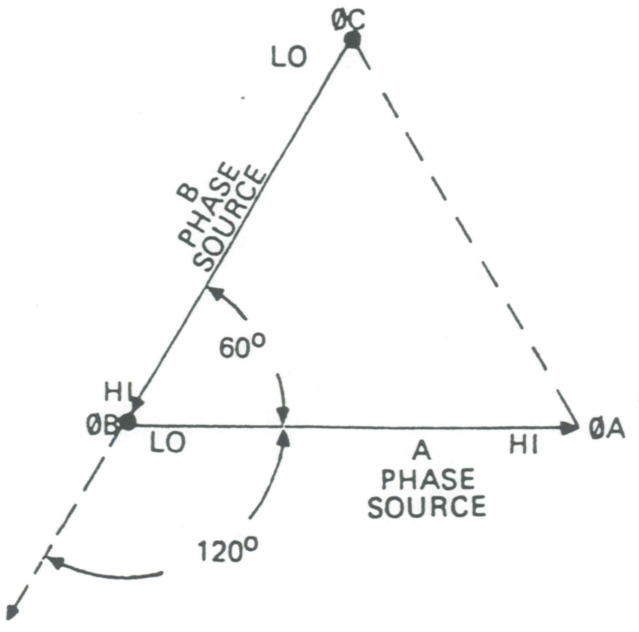
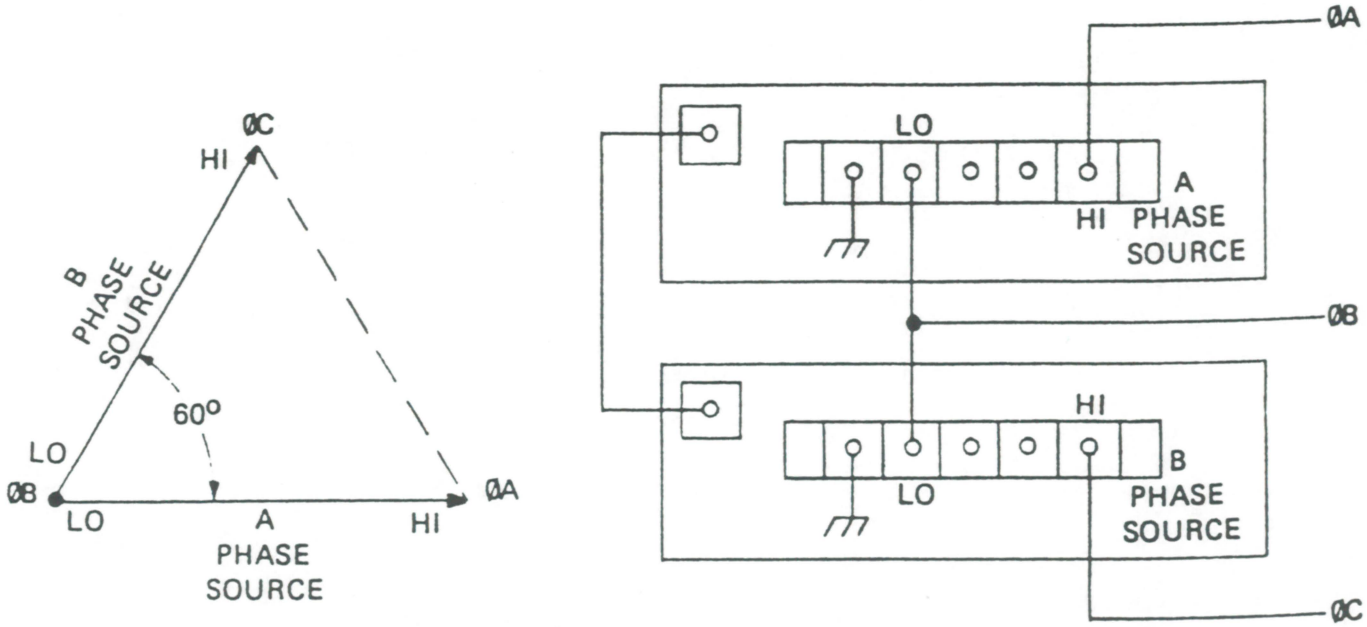


Figure 4-1.

4-15. Certain specialized oscillators such as the Super-Stable (SS) series and the Quasi-Square wave series are designed only for the open delta configurations using two amplifiers and have the phase and angle between the ØA and ØB drive signals at 60°.

4-16. When using the SS series or quasi-square wave systems, the interconnections would be per Figure 4-2.

QUASI-SQUARE WAVE SUCH AS 443-1-111



SUPER STABLE SUCH AS 443-.01SS

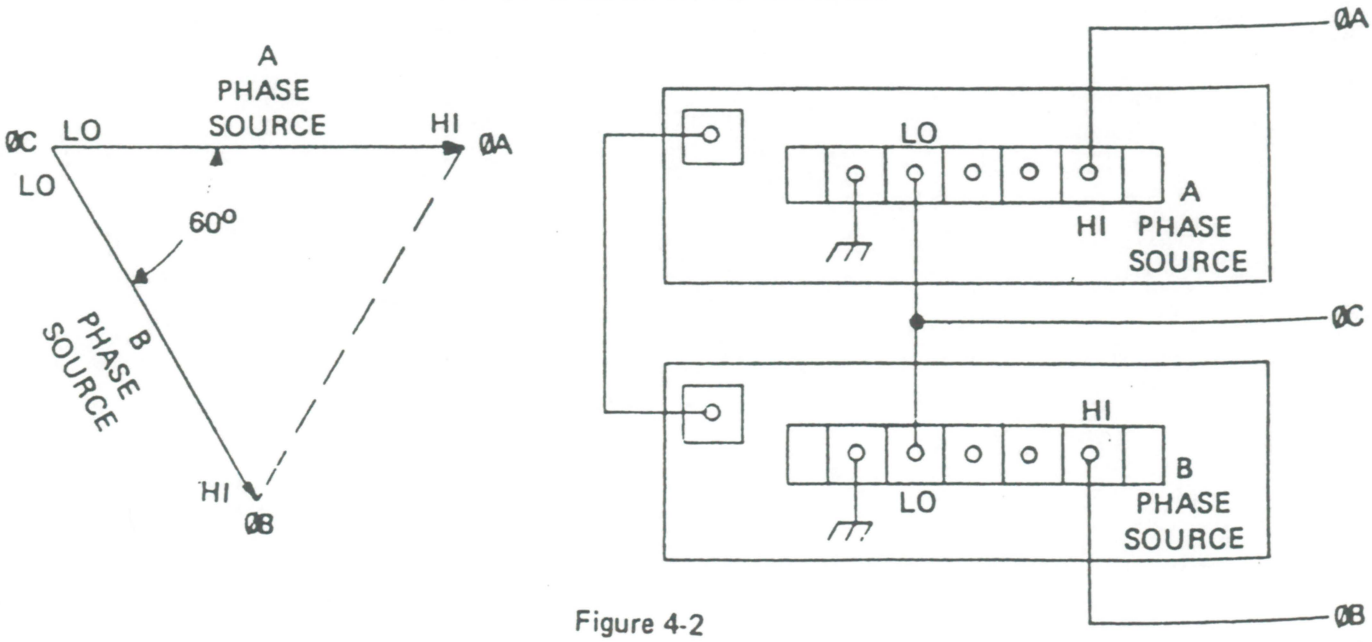
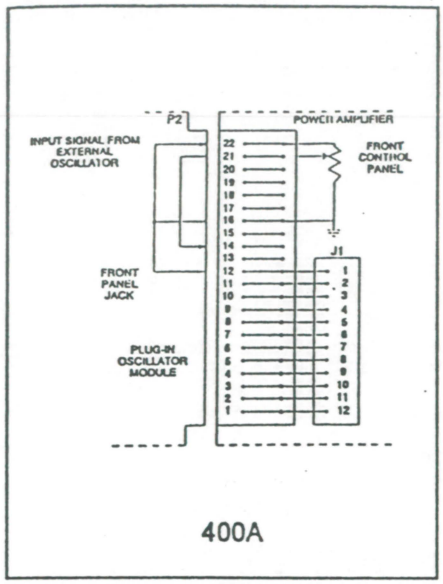
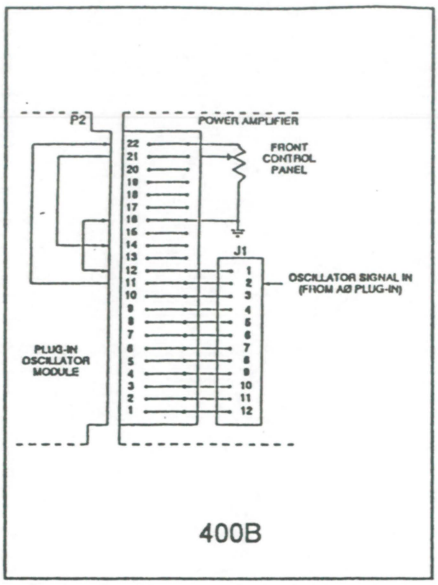


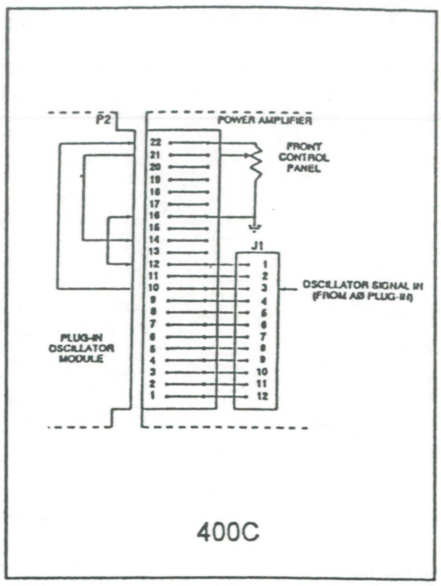
Figure 4-2



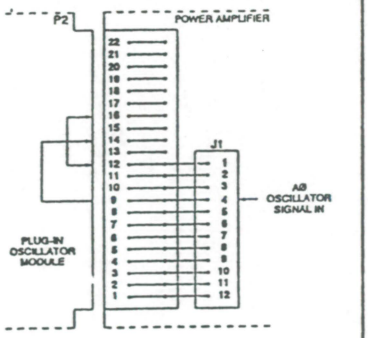
400A



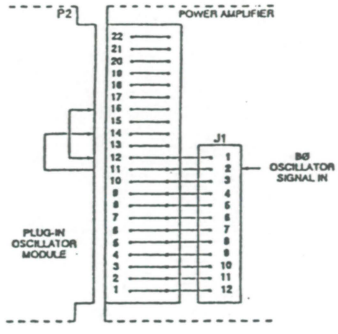
400B



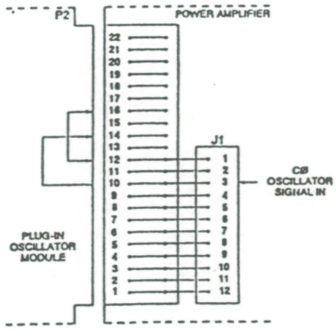
400C



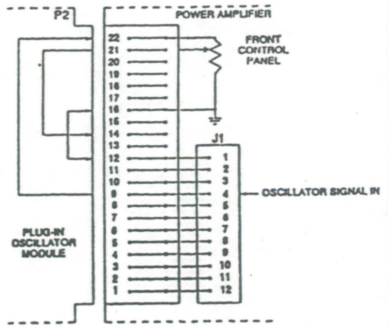
400DPA



400DPB



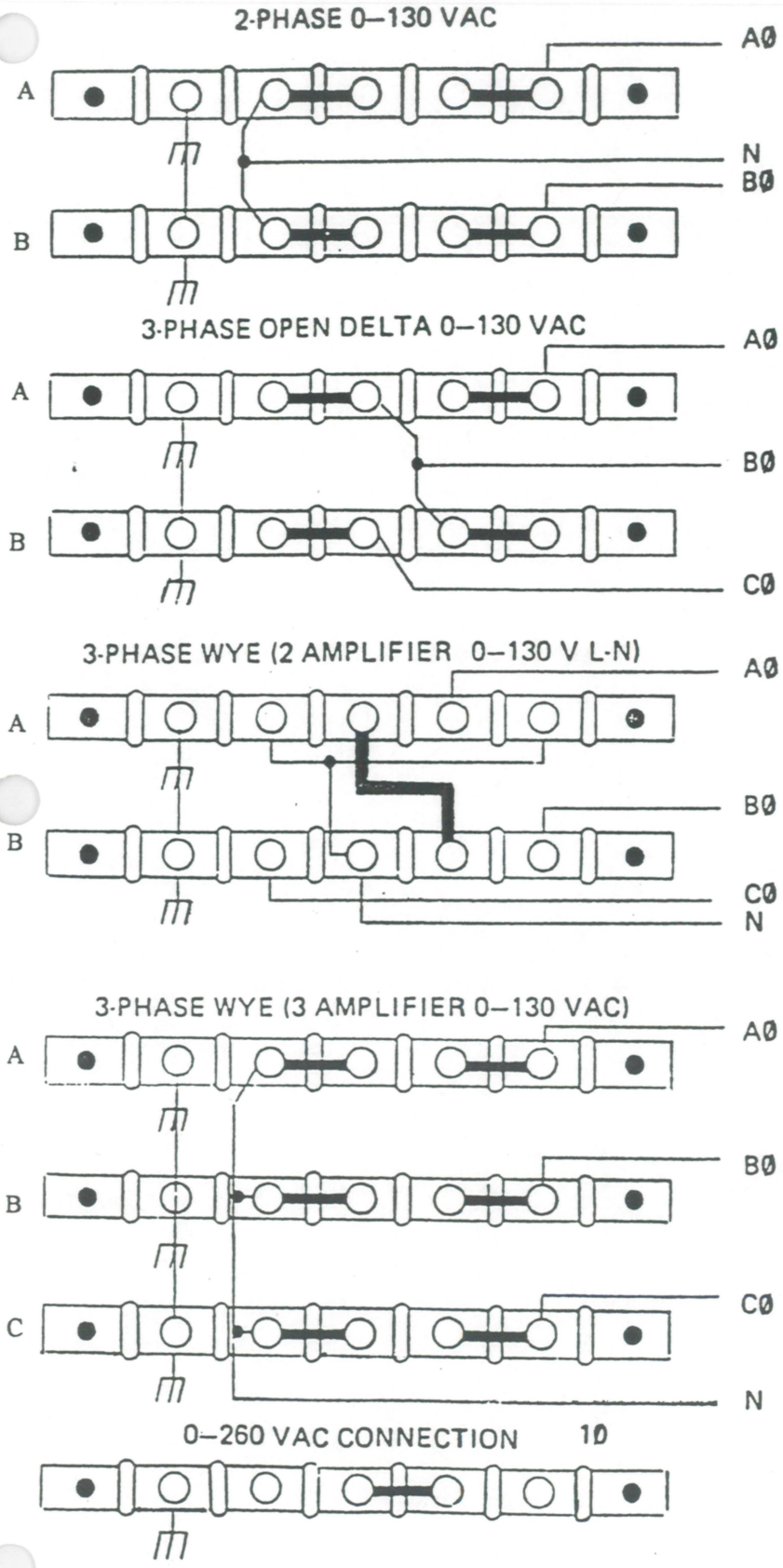
400DPC



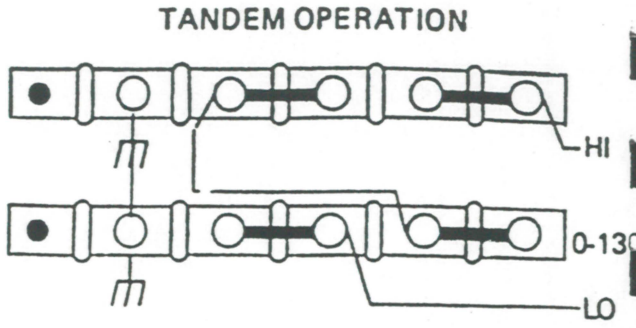
400BT

Figure 4-3. Signal Routing Plug-in Connections

OUTPUT CONFIGURATIONS FOR MODEL 121B



EACH AMPLIFIER PLUS INTERCONNECTION BETWEEN UNITS. VALID FOR ALL BUT 2 AMP WYE



NOTE: FOR 0-130V TANDEM OPERATION INTERNAL WIRING FROM TERMINAL BLOCK TO TRANSFORMER MUST BE CHANGED. REFER TO 121B SCHEMATIC.

FOR TANDEM OPERATION, 260V OUTPUT USE STD. INTERNAL CONNECTIONS AND 0-130V OUTPUT.

Figure 4-4. Interconnections for Multiphase Operation

SECTION V
MAINTENANCE AND ADJUSTMENT

5-1. SERVICE INFORMATION

5-2. Questions concerning the operation, repair of servicing of this instrument should be directed to the Elgar Repair Department. Include the Model and Serial number in any correspondence concerning this instrument.

5-3. FACTORY REPAIR

5-4. Should it be necessary to return an instrument to the factory for repair, please contact the Elgar Repair Department for authorization to make shipment. Do not return the unit without authorization.

ELGAR
Repair Department
9250 Brown Deer Road
San Diego, CA 92121-2294
1-800-733-5427
Tel: (858) 450-0085
Fax: (858) 678-4482
www.elgar.com

5-5. TEST POINTS

5-6. Test points and adjustment controls are conveniently provided at the top of the amplifier circuit board, accesible by removing the top cover of the instrument (see Figure 5-1.) The test points are as follows:

TP1 – Circuit common
TP2 – Amplifier output
TP3 – Oscillator signal

5-7. OUTPUT REGULATION ADJUSTMENT

5-8. The regulation adjustment, R7, is set at the factory to give ±1% load regulation over the frequency range of the power source. The regulation may require re-adjustment if the load is highly reactive or if zero regulation is desired for a specific load and frequency. To make this adjustment, disconnect the load and read the output voltage. Connect the load and adjust R7 until the same reading is obtained.

NOTE

If the load is heavy enough to cause current limit transistors Q5 and Q4 to conduct, the output voltage will be reduced, giving an indication of poor load regulation. Load voltage fall-off due to current limiting action should not be compensated by the regulation adjustment

5-9. CURRENT LIMIT ADJUSTMENT

5-10. Current limits are preset with selected components at the factory and therefore are not field adjustable.

5- 11. PERIODIC MAINTENANCE

5-12 The only periodic maintenance required by the Model 121B power source is occasional cleaning of the heat sinks. The heat sinks may be inspected through the front panel air grill. If enough dust and dirt have accumulated to restrict the air flow an air jet should be directed through the front panel grill while the instrument is operating. if this does not dislodge the dirt, the heat sink must be removed to be cleaned.

5-13 TROUBLESHOOTING

5-14 CIRCUIT BREAKER TRIPS. If the circuit breaker trips at no load, a fault in either the power transistors or power rectifiers is indicated. Unplug both heatsinks and try the circuit breaker. If it does not trip, look for shorted power transistor, (power transistors can be tested with an ohmmeter). If the circuit breaker still trips, look for a shorted rectifier bridge,. If all diodes and filter capacitors are good, a fault in the power transformer or wiring harness is indicated.

5-15 OUTPUT DISTORTION. Output distortion may be caused by over loading. Check the load current waveform with an oscilloscope scince some high crest factor loads may draw considerably mor peak current than is indacted by a load ammeter.

5-16 OVERHEATING. If overheating causes thermostat S1 to close, the output voltage will fall to zero. Over heating may be caused by restricted air flow or excessive environmental temperature (greater than 50° C).

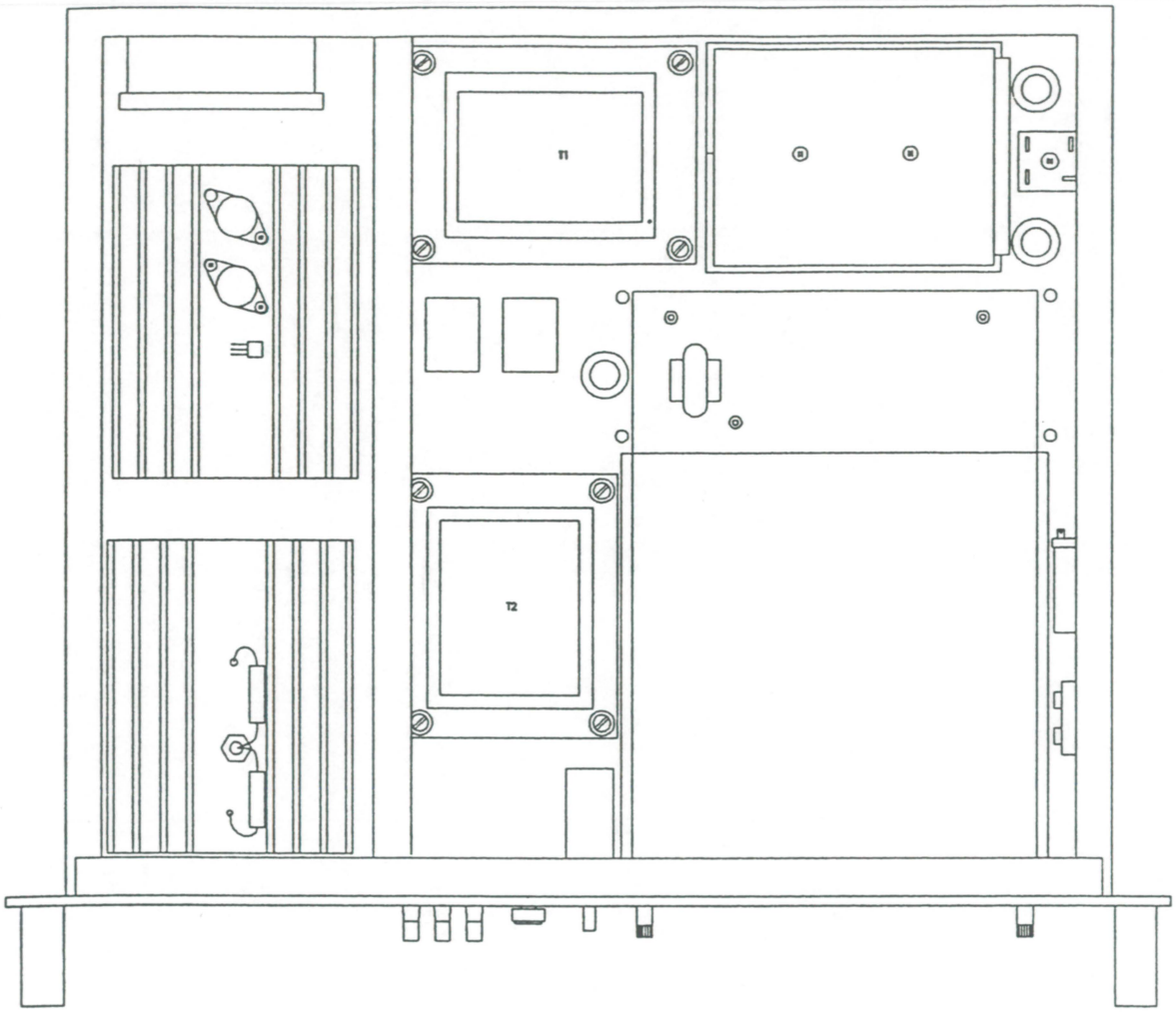
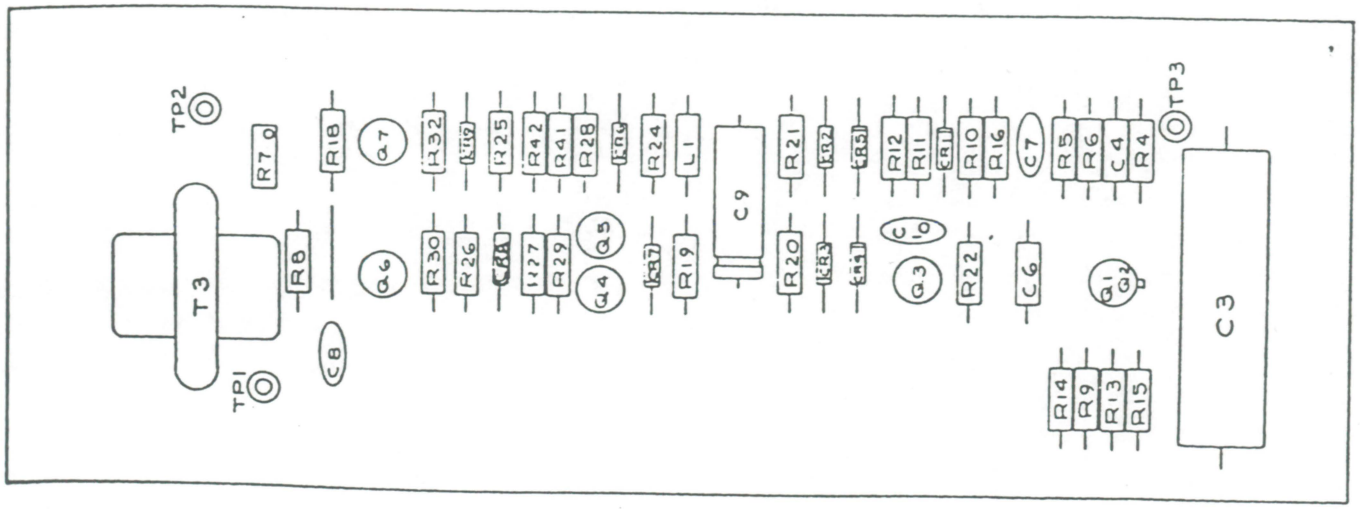


Figure 5-1. Top View



14-101-40 Amplifier Board Assy

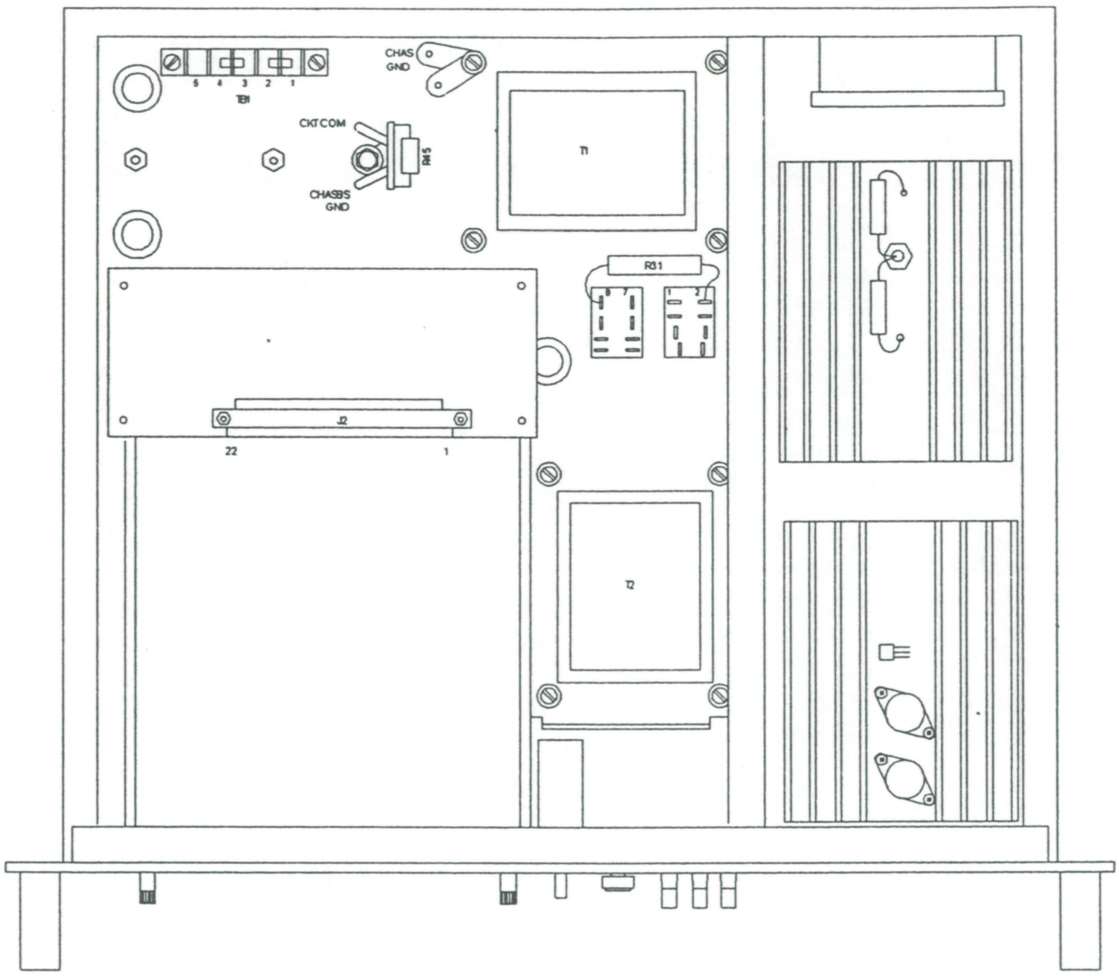


Figure 5-2. Bottom View

SECTION VI
PARTS LIST

6-1. GENERAL

6-2. This section contains a listing of all parts necessary for factory authorized repair for the Model 121B AC Power Source. Location of parts is noted to the assembly it is listed under. Parts are located on the diagrams in Section VII and correlated on the parts list by using their reference designators and/or Elgar part number. Note that trimming capacitors and trimming resistors are factory selected, and their replacement is considered beyond the scope of customer maintenance.

6-3. SPARE PARTS

6-4. When ordering spare parts, specify name, part number, manufacturer, component value and rating. Where no specific manufacturer or part number is given, the replacement parts should conform to value, rating and tolerance as listed. If complete assemblies are desired, specify the assembly number, and the instrument model number. Order from Elgar, 9250 Brown Deer Road, San Diego, CA 92121-2294.

6-5. PARTS LISTS

6-6. The following list reflects the parts lists included in this section:

ASSEMBLY	DECSRIPTION
514-007-40	121B Final Assembly
614-245-40	Chassis Assembly
614-246-40	Front Panel Assembly
614-211-40	Tray Assembly
614-101-45	Amplifier Board Assy
614-206-43	Upper Heatsink Assy
614-208-43	Lower Heatsink Assy

SECTION VII
DIAGRAMS

7-1. GENERAL

7-2. This section contains the schematic diagrams and parts layout for the AC Power Source. The schematic diagrams should be used to understand the theory of operation and as an aid in troubleshooting the unit. Reference designators shown on schematics correspond to reference designators listed in the parts lists, where exact values are given. Components identified as "trim" or "t" are factory selelcted parts whoses values aredetermined at the time of final checkout.

7-3. DIAGRAMS

7-4. Diagrams included in this section are as follows:

121B Schematic Diagram (7-3/7-4)

Amplifier Board Part Layout (7-3/7-4)

Typical Plug-in Oscillator and Power Source Interconnection (7-5/7-6)

Chassis Assy Diagram 614-245-40

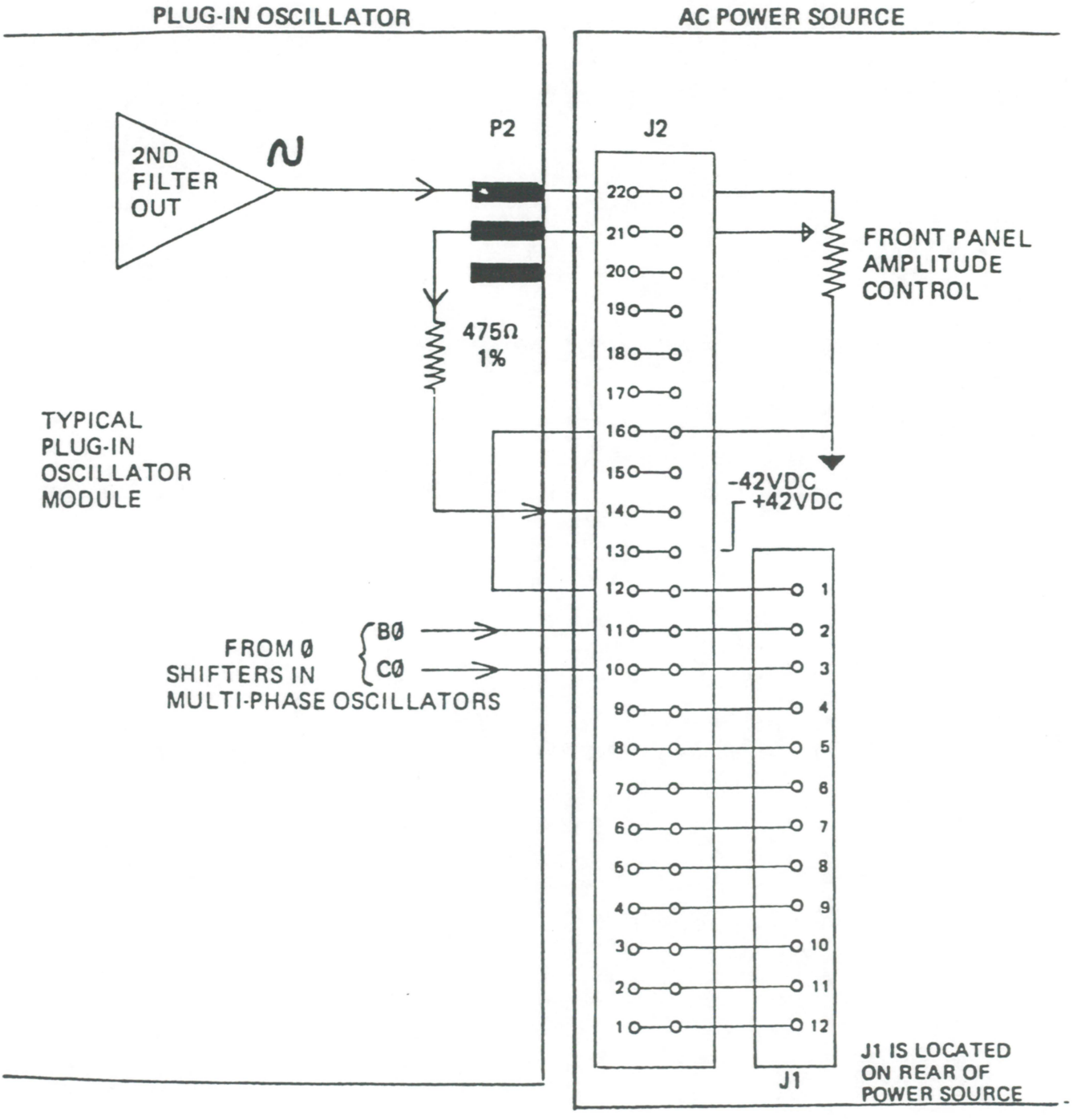


Figure 7-2. Typical Plug-In Oscillator/Power Source Interconnection

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		REDRAWN 3-28-80 S.T.		
	A	ECN #2454 ADDED J2-18&19 MBS	1-4-82	
	B	ECN # 4547 7-12-84 H.N	7-23-84	
	C	ECN 6080A 3-31-01 CD	5-1-87	
	D	REVISED PER ECN N950742	9-21-95	
	E	REVISED PER ECN N960645	10/25/96	
	F	REVISED PER ECN N970867	10-14-97	

5 MINIMUM VALUE OF TRIM (R41 & R42) SELECTED SO THAT THE 60 HZ INPUT LINE CURRENT DOES NOT EXCEED 6.0A RMS WITH A SHORT CIRCUIT ON THE OUTPUT. ENSURE THAT OUTPUT SHORT CIRCUIT CURRENT DOES NOT EXCEED 2.3 AMPS (RMS). MAXIMUM VALUE OF TRIM (R41 & R42) SELECTED SO THE UNIT WILL SUPPLY 120 VA OUTPUT AT 110 VAC @ 0.7 POWER FACTOR AT 45 HZ OUTPUT.

INPUT LINE CORD
HI
LO
GND
CB1 6.5A
B1
DS1
TB1
T1
115V JUMPER 1-2, 3-4 (TB1)
230V JUMPER 2-3 (TB1)
INPUT VOLTAGE CONNECTIONS
AC BRI MDA 990-3
C1 9300 uf 50V
C2 9300 uf 50V
R2 4.7K 2W
R3 4.7K 2W
R45 4.7Ω
+40
-40
J2
J1 LOCATED ON REAR PANEL
J3 P3
J4 P4
+40
R1 10K
TP1
TP3
R4 3.32K 1%
C3 10 uf
Q1
Q2
2N3810
R11 3.9K
R10 6.2K
C9 50 uf/50V
CR1 1N5242
R15 2.2K
TP2
R9 4.7K
C7 200pf
R16 33.2K 1%
R18 4.7K
C8 220 uf 10V
C10 220 uf
R12 100Ω
R5 4.75K 1%
R6 T
C4 T
R13 1.5K
R14 T
C6 T
Q3 2N3440
R22 200Ω
R7 1K
R8 33Ω
R19 4.7K
R20 4.7K
R21 68Ω
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
Q5 2N3567
R41 T 51Ω MIN. 100Ω MAX.
R24 T
R26 1.8K
L1 150 uhy
R42 T 51Ω MIN. 100Ω MAX.
R27 5.6K
Q4 2N3638
R28 68Ω
R25 6.2K
R29 68Ω
Q7 2N3440
R32 100Ω
R31 .1Ω 10W
Q6 SJ5109 (2N4236)
C11 .01 uf NOM FSV
R30 100Ω
-40
S1
UPPER H.S. ASSY 614-206-43
CR11 S2160
Q8 TIP29B/C
Q9 2N4348
Q10 2N4348
C11 .0047
R33 47Ω
R34 47Ω
R35 .22Ω 5W
R36 .22Ω 5W
LOWER H.S. ASSY 614-208-43
CR12 S2160
Q11 TIP29B/C
Q12 2N4348
Q13 2N4348
C12 .0047
R37 47Ω
R38 47Ω
R39 .22Ω 5W
R40 .22Ω 5W
T3 LOC ON AMPL BRD
T3
T2
TB2
C13 .015
C14 .015
M1
0-130V
0-260V
0-130V
BLK
WHT
RED
FRONT PANEL BINDING POSTS
JUMPER TB2 4-5, 2-3 FOR 130 V OUTPUT.
JUMPER TB2 3-4 FOR 260 V OUTPUT
AMPLIFIER BOARD
514-007-60
FOR PARTS LIST SEE PL

NOTES: (UNLESS OTHERWISE SPECIFIED)
1. ALL RESISTORS ARE 1/2W, 5% CARBON.
2. ALL RESISTANCE VALUES ARE IN OHMS (Ω).
3. ALL CAPACITANCE VALUES ARE IN MICRO-FARADS (uf).
4. ALL DIODES ARE IN4004.
5. SEE ABOVE RIGHT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS .XX ± .03, .XXX ± .010; FRACTIONS ± 1/32; ANGLES ± 1/2°. DO NOT SCALE THIS DRAWING
MATERIAL:
FINISH:
NEXT ASSY. | USED ON
APPLICATION
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CONTRACT NO.
FIRST MADE FOR:

APPROVAL		DATE
DRAWN	TOOTHACRE	3-28-80
CHECKED		
PROJ ENG		3-31-80
QA-REL		

ELGAR CORPORATION
SAN DIEGO, CALIFORNIA

OVERALL SCHEMATIC
MODEL 121 B

SIZE	CODE IDENT. NO.	DRAWING NO.	RFV
D	25965	514-007-60	F

SCALE NONE | SHEET 1 OF 1

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Figure 7-1. 121B Overall Schematic and Reference Designator

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